



King County's Environmental Laboratory

Helping safeguard the region's water quality



King County

Department of Natural Resources and Parks
Water and Land Resources Division

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The Environmental Laboratory (Lab) helps protect the Puget Sound's high quality of life by providing first rate field, laboratory, information, and advisory services to King County and other public agencies that protect and enhance water quality. The Lab is a full-service facility, providing technical consultation, sample collection, analysis in five different lab areas, and data management and interpretation. For example, if there is a fuel spill in Puget Sound or the water quality of a local lake is in jeopardy, the Environmental Lab provides the expertise to identify the extent of such problems and help natural resource managers make good decisions about how to minimize harm to the environment, people, fish and wildlife.



Monitoring the region's water



In an average year, the Lab serves more than 150 King County projects, analyzes 15,000 samples, and produces close to 400,000 data points for use in environmental studies and decision-making. The Lab analyzes samples for other public agencies on a reimbursable basis and provides training by special arrangement.

This information forms a database that is used to monitor trends in regional waters. King County uses information from the Lab to:

- Design and operate wastewater treatment plants.
- Enforce industrial waste regulations.
- Monitor recycled products such as biosolids and reclaimed water.
- Formulate plans and action programs to protect and enhance local water bodies.
- Protect public health.
- Participate in cooperative studies with other governmental and research agencies.

Ensuring accurate data

The Lab is accredited by the Washington State Department of Ecology (WDOE). This allows Lab data to be used for regulatory purposes related to drinking water, wastewater, sediment and hazardous waste testing. During recent audits, WDOE has cited the Environmental Lab as an "exemplary laboratory", whose "dedication to quality assurance and the production of accurate and defensible data is evident throughout the Lab."





Field scientists collect samples from marine and fresh waters, industries, wastewater treatment plants, and biosolids land application sites. Samples are taken using specific protocols to preserve the integrity of the sample, and then transported back to the Lab. Environmental scientists analyze those samples in the trace metals, trace organics, conventional, microbiology, and aquatic toxicology laboratories. Data from the analyses are validated and stored on a database containing four decades of environmental data.

Environmental Services Unit

Field scientists use a variety of equipment and techniques to obtain samples truly representative of the environment. The scientists conduct sampling and field data collection including: water column sampling (essentially a "cylinder" of water from the surface of a water body to the bottom and within which physical and chemical properties can be measured) in marine and fresh water; sediment sampling in Puget Sound and Lake Washington; and storm sampling of combined sewer overflows, rivers and streams. They also sample wastewater at the sewage treatment plants, groundwater in wells, and surface waters at biosolids forest application sites.



The 43-foot research vessel, Liberty, moored at the Lab's waterfront site, collects Puget Sound water and sediments using specialized equipment.



Trace Metals

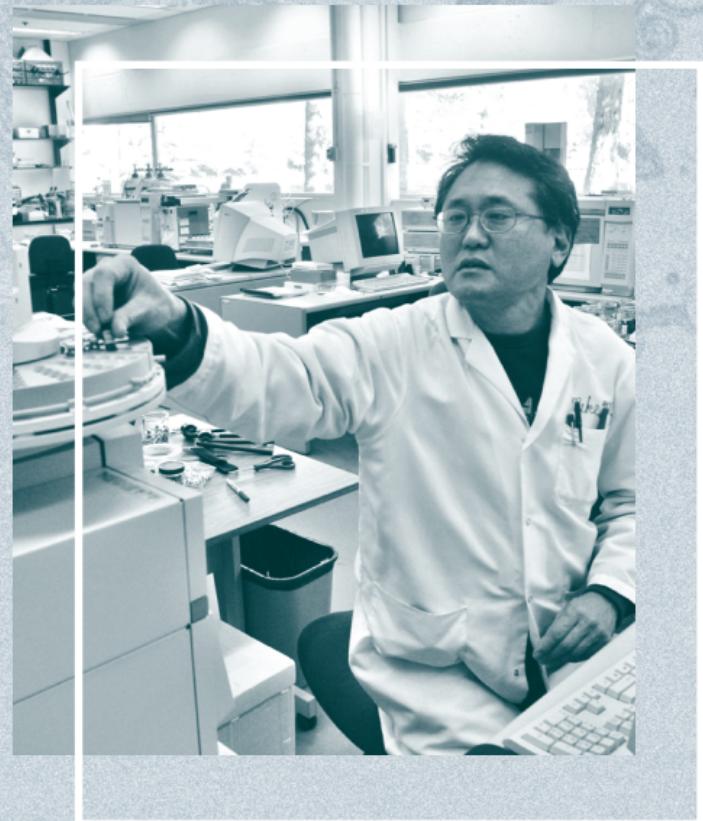


Trace Metals analyzes samples for more than two dozen potentially toxic metals. Of the many metallic elements found in the environment, some such as calcium, magnesium, zinc, and copper are essential nutrients at low concentrations, but may be hazardous at higher levels. Others, like arsenic, lead, mercury, and cadmium are toxic even at relatively low concentrations. Trace Metals utilizes highly sensitive instruments to test for trace elements at the level of parts per trillion. In addition, the lab is capable of testing for mercury at six different ranges, including ultra-trace level testing. This specialized testing is not widely available, and is of particular value to King County projects requiring risk analyses.

Trace Organics

Trace Organics measures trace levels of organic (carbon-containing) compounds found in air, liquids, or solids. The unit routinely analyzes for federally designated priority pollutants and hazardous substances such as pesticides, PCBs, volatile solvents, byproducts of fuel combustion and other potentially toxic or hazardous organic contaminants. Additionally, Trace Organics has developed analytical techniques to analyze for endocrine-disrupting compounds (EDCs) and other analytes that are being used to evaluate the health of our lakes, streams, and Puget Sound.

Trace Organics utilizes sophisticated instrumentation to "fingerprint" and identify unknown organic compounds in a matter of seconds. The fingerprint, called a spectrum, can be searched against a library containing reference spectra for more than 100,000 potentially toxic organics.





Conventional

Conventional analyzes more than 30 inorganic parameters that are indicators of water quality. Tests for turbidity (the amount of sediment clouding the water), dissolved oxygen and pH, and measurements of ultra low level nutrients such as nitrogen and phosphorus, alert scientists to changes in the ecological balance of area waters. In addition to water quality measurements on samples from regional waters, Conventional measures cyanide and Biochemical Oxygen Demand in municipal and industrial discharges, analyzes for several parameters in biosolids, soils and sediments and characterizes contaminated drainage from construction sites.

Conventional is equipped with state-of-the-art equipment and automated instrumentation capable of measuring environmental quality indicators with high precision and accuracy.

Microbiology

Microbiology analyzes for bacteria, viruses, algae, and fungi. Virological and parasite analyses are regularly performed on wastewater and solid samples. These data are used primarily to help monitor organisms in samples such as recycled products (biosolids and reclaimed water) to assure that these products pose no risks to humans or the environment. Algae identifications are performed to assist in monitoring county lakes and surface waters.

Microbiologists often work with health officials in applying the data to make judgments such as the appropriate time to close public beaches or post information about shellfish contaminations.

Microbiology has also expanded its abilities to include some genetically-based methods, in order to more easily identify the source of particular pathogens.



Aquatic Toxicology and Immunoassay



Aquatic Toxicology conducts toxicity tests by exposing freshwater or marine aquatic organisms to environmental samples such as treatment plant discharges or sediment, and then monitoring the organism's response. This information helps King County understand the impact of pollutants on the local aquatic

environment, and to comply with National Pollution Discharge Elimination System permit and Washington State Sediment Management Standards.

In addition to toxicity testing, Aquatic Toxicology specializes in using Enzyme-Linked Immunosorbent Assays (ELISA) to measure chemical concentrations and blue-green algae toxins in the environment.

Quality Assurance Program

The mission of the Quality Assurance (QA) program is to establish and maintain standardized practices for sample collection and analysis that meet the goals and expectations of our clients. The quality of the Lab's operations and data are audited regularly by the accreditation office of WDOE. In addition, several times per year blind Performance Evaluation (PE) samples are run and the results are certified independently. The Lab's rating on these independent PE samples averages from 98 to 100 percent accuracy, well above industry standards.



Laboratory Project Management

The Laboratory Project Managers (LPMs) are the focal point for coordination between the Lab and our customers. LPMs work with customers to understand project goals, and assist in determining specific sampling and testing requirements. LPMs monitor the progress of projects to ensure timely completion, coordinate the Lab's response to project changes, and help ensure that the right type and quality of data are generated for each project.



Information Systems and Data Analysis Unit



Each year, the Lab collects and processes thousands of environmental samples. The analytical results from those samples become several million pieces of discrete data. The Lab's Information Systems and Data Analysis (ISDA) unit uses a computerized Laboratory Information Management System (LIMS) to track samples as they enter the Lab and move through analysis in the various Lab areas, and then store the final data that are generated. LIMS runs on a state-of-the-art computer and contains several decades of environmental data.

Trouble Call Program

The Trouble Call Program responds to wastewater emergencies, fuel spills, illegal dumping activities, fish kills, erosion and sediment control issues from construction activities, and other types of incidents that impact King County surface waters and the wastewater conveyance system.

By developing cooperative working relationships with other agencies such as water/sewer districts or cities, the Trouble Call Program can assist with the investigation of water quality incidents that may impact multiple service areas. Since the program is part of the Lab, a range of resources is available to assist with almost any type of water quality response.



Photo by Benjamin Budka

Tours

If you or your organization would like a tour of the Environmental Laboratory, which is wheelchair accessible, please call 206-684-2300.

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